

## REMARKS

Claims 1-29 are pending prior to this amendment.

The examiner objects to claim 17 for an informality.

The examiner rejects to the abstract for informalities.

The examiner rejects claims 1-29 under 35 U.S.C. §102(b) as being anticipated by Hembree et al (U.S. Pat. No. 6,218,848).

The applicants amend no claims.

Claims 1-29 remain in the application after this amendment.

The applicants add no new matter and request reconsideration.

### Abstract Objections

The applicants amend the abstract to avoid using the word means.

### Claim Rejections Under §102(b)

The examiner rejects claims 1-29 as old over Hembree.

The applicants disagree for the reasons that follow.

As the applicants noted before, Hembree describes a semiconductor probe card having a resistance measuring circuit and method of fabrication. In Hembree, the "resistivity measuring circuit evaluates a total resistance Rx of the electrical path between the resistivity contacts." Abstract. That is, Hembree discloses a measuring circuit 38 to measure a total resistance between the resistivity contacts. Hembree does not disclose measuring a per channel resistivity as recited in the claims. Hembree's total resistivity measurement is then used to notify an operator that "the contacts 22 require cleaning" (column 8, line 65) or that contacts 22 are "misaligned." If the contacts 22 are misaligned, the tester 26 adjusts the "test signals to the probe card 22...to compensate for the high contact resistance." Hembree, column 8, lines 58-60.

Claim 1 recites *computing a per channel standard deviation responsive to measuring the contact resistance*. Independent claims 11, 16, and 24 include a similar limitation. The examiner alleges Hembree's tester 26 generally, and its resistivity circuit 38 more specifically, could compute the recited per channel standard deviation after measuring the contact resistance via its resistivity measuring circuit 38. The examiner alleges that the "applicants in the claims have not provided what is meant by 'standard deviation.'" And that "the examiner has established that resistivity measuring circuit 38, which is located inside tester 26, measures the contact resistance in the dice 12 of the wafer 10 via electrical path 34.

With that in mind, it appears that Hembree's tester could computer the standard deviation of the contact resistance of the die on the wafer."

Hembree's tester 26 is "configured to apply test signals through the probe card 20 to the wafer 10 and to analyze the resultant signals." Hembree, column 4, lines 29-32. The tester 26 includes a resistivity measuring circuit 38 that measures "an unknown resistance Rx (FIG. 6B) between the resistivity contacts 22-1, 22-2 ... by applying a test current from source terminals (source Hi, source Lo) through a known resistance RL to the resistivity contacts 22-1, 22-2. .... This enables Rx to be quantified and evaluated. One method for evaluating the resistance Rx is by making resistance measurements when the probe card 20 is new, or immediately following cleaning. These initial values for Rx can then be compared to measured values for Rx during test procedures using the probe card 20." Hembree, column 8, lines 18-33.

But nowhere does Hembree disclose that its tester 26 or circuit 38 computes a per channel standard deviation much less computes a per channel standard deviation responsive to measuring the contact resistance as recited. Hembree never once mentions making a standard deviation computation. The term standard deviation is nowhere found in Hembree.

The applicants do not understand the examiner's allegation that they have not stated what is meant by standard deviation in the claims. The term standard deviation is not only well known to a person of skill in the art, but also well defined in the specification. The specification provides an exemplary definition of standard deviation in paragraph 0033.

"At 312, the tester 202 computes a per-pin (or channel) contact resistance standard deviation using the plurality of per-pin contact resistance measurements available from 310. The tester 202 computes the standard deviation using well-known formulas for computing standard deviation, e.g., the square root of the sum of the square of the difference between X and X bar, divided by N or N-1 (depending on the population), where X is a contact resistance on the pin (or channel) under consideration and X bar is an average or mean of all contact resistance measurements under consideration."

A dictionary defines standard deviation as a statistic used as a measure of dispersion or variation in a distribution, equal to the square root of the arithmetic mean of the squares of the deviations from the arithmetic mean.<sup>1</sup> An alternate dictionary definition defines standard deviation as a measure of dispersion of a group of measurements relative to the mean

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<sup>1</sup> Excerpted from *The American Heritage® Dictionary of the English Language, Third Edition* © 1996 by Houghton Mifflin Company.

(average) of that group. Standard deviation is the square root of the average of the squares of each score's difference from the mean.<sup>2</sup>

The examiner suggests that because Hembree discloses measuring the contact resistance in the dice 12 of the wafer 10 via electrical path 34, that it "could compute the standard deviation." The applicants remind the examiner that an anticipatory reference must disclose each and every element and limitation of the claim. The test is not whether the anticipatory reference "could" disclose each and every element and limitation but whether it does disclose in fact. To anticipate the recited computing a standard deviation, Hembree must actually disclose computing a standard deviation and not merely that Hembree's tester 26 "could" disclose computing a standard deviation.

Hembree's tester 26 measures a total resistance Rx between resistivity contacts, not a per channel resistivity as recited. It would appear that if Hembree does not disclose per channel resistivity measurements, that it cannot disclose computing a per channel standard deviation because such a computation could not be accomplished with the measurement of a total resistance Rx.

Claim 1 recites *comparing the standard deviation on the at least one channel to a threshold and increasing the overdrive responsive to comparing the standard deviation*. Claim 15 recites *where the means for increasing the overdrive increases the overdrive if the standard deviation is less than a predetermined threshold*. Claim 16 recites *comparing the standard deviation on the at least one channel to a threshold and increasing the overdrive responsive to the comparison*. Claim 24 recites *comparing the standard deviation on at least one channel to a threshold and increasing the overdrive responsive to comparing the standard deviation*. Since Hembree does not compute a standard deviation, it cannot disclose comparing the standard deviation as recited in the claims. Even if Hembree "could" disclose computing a standard deviation as the examiner alleges, the claims recites comparing the standard deviation to a threshold and then increasing the overdrive responsive to the comparing. Nowhere does Hembree disclose that its resistivity measurement Rx is used to overdrive the chuck responsive the comparison.

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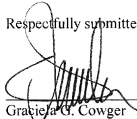
<sup>2</sup> *Id.*

### **Conclusion**

For the foregoing reasons, the applicants request reconsideration and allowance of all remaining claims. The Applicants encourage the Examiner to telephone the undersigned at (503) 222-3613 if it appears that an interview would be helpful in advancing the case.

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Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Graciela G. Cowger', is written over a horizontal line.

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